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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/677,239	10/03/2003	William Earl Russell II	24GA5997	9110

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EXAMINER	
FRISBY, KESHA	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	**Application No.** 10/677,239	**Applicant(s)** RUSSELL ET AL.	
	Examiner Kesha Frisby	**Art Unit** 3714	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 March 2007*.
2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-35* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a)☐ All b)☐ Some * c)☐ None of:
1.☐ Certified copies of the priority documents have been received.
2.☐ Certified copies of the priority documents have been received in Application No. _____.
3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

After the amendment filed on 3/15/2007, claims 1-35 are pending in this case.

Claim 35 is a newly added claim.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 35 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The examiner does not find any reference to the limitations of claim 35 in the current specification.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 1-4, 6-21 & 23-35 are rejected under 35 U.S.C. 102(b) as being anticipated by Russell (EP 1113457 A1).**

Referring to claim 1, Russell discloses receiving user input to modify one or more design inputs used in creating a response surface, the response surface defining relationships between the design inputs and operational outputs of at least one or more aspects of a core design (column 1 lines 21-37); and generating a reactor simulation based on the response surface for the core design and the modified design input (column 5 lines 6-22).

Referring to claim 2, Russell discloses further comprising: accessing the response surface for the core design from a database (abstract).

Referring to claims 3 & 20, Russell discloses wherein the design inputs include at least one of control blades positions over time, bundle types of fresh fuel, loading pattern of exposed fuel, and water flow through the reactor core (for ex: column 1 lines 4-11 & lines 31-37).

Referring to claims 4 & 21, Russell discloses wherein the operational outputs include at least one of critical power ratio (CPR), shutdown margin (SDM), maximum average planar linear heat generation rate (MAPLHGR), maximum fraction of linear power density (MFLPD), hot excess reactivity, radial and axial power peaking, peak fuel rod and bundle exposure, Uranium utilization as measured by reactor energy output produced (in mega-watt-days) per kilogram of Uranium-235 loaded (for ex: column 18 lines 40-46).

Referring to claims 6 & 23, Russell discloses wherein the response surface includes information defining a plurality of predictors, each predictor predicting one of the operational outputs based on one of the design inputs (column 10 line 45- column 11 line 4).

Referring to claim 7, Russell discloses wherein the generating step uses one or more predictors associated with the modified design input to generate new operational outputs (column 6 lines 2-7).

Referring to claims 8 & 24, Russell discloses wherein each predictor is one of a second order polynomial and a linear function (for ex: column 18 lines 19-23).

Referring to claim 9, Russell discloses further comprising: providing feedback to the user on the generated reactor simulation (column 3 lines 11-47: trial-and-error basis).

Referring to claims 10 & 25, Russell discloses wherein the providing step provides an old objective function value for the core design prior to modification of the design input and a new objective function value for the core design after modification of the design input (for ex: abstract and claim 1 part d).

Referring to claims 11 & 26, Russell discloses wherein a same objective function is used to determine the old and new objective function values (for ex: abstract and claim 1 part d).

Referring to claims 12 & 27, Russell discloses wherein the same objective function is the objective function used to create the core design (for ex: abstract and claim 1 part d).

Referring to claims 13 & 28, Russell discloses wherein the same objective function is a different objective function than an objective function used to create the core design (for ex: abstract and claim 1 part d).

Referring to claims 14 & 29, Russell discloses wherein different objective functions are used to determine the old and new object function values (for ex: abstract and claim 1 part d).

Referring to claims 15 & 30, Russell discloses wherein the providing step provides a worst case value for at least one of the operational outputs (this can be accomplished during the trial-and-error basis).

Referring to claims 16 & 31, Russell discloses wherein the providing step provides the worst case value for one or more operational outputs selected by the user (this can be accomplished during the trial-and-error basis).

Referring to claims 17 & 32, Russell discloses wherein the reactor being simulated is a boiling water reactor (for ex: column 4 lines 24-27).

Referring to claims 18 & 33, Russell discloses wherein the reactor being simulated is a pressure water reactor (for ex: column 6 lines 53-58).

Referring to claim 19, Russell discloses comprising: identifying a response surface, the response surface defining relationships between design input and operational outputs of at least one or more aspects of a core design (abstract & column 1 lines 21-37); inputting a modification to a design input of the core design (column 1 lines 21-37); receiving one or more reactor simulation results for a reactor simulation of the core design with the changed designed input (column 6 lines 17 & 18 & column 12 lines 52-56).

Referring to claim 34, Russell discloses comprising: operating a nuclear reactor using a reactor simulation generated based on a response surface for a core design and a modified design input received from a user (column 5 lines 6-22), the modified design input being a modification of a design input used in creating the response surface (column 1 lines 21-37), the response surface defining relationships between the design inputs and operational outputs of at least one or more aspects of the core design (abstract & column 1 lines 21-37).

Referring to claim 35, Russell discloses wherein the operating a nuclear reactor includes moving and placing nuclear components based on the output of a reactor simulation involving a response surface (column 1 lines 12-37).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 5 & 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Russell in view of Alliston (U.S. Patent Number 3,919,720).

Referring to claims 5 & 22, Russell discloses the method of claim 1. *Russell does not disclose wherein the generating step generates the reactor simulation in real time.* However, Alliston teaches wherein the generating step generates the reactor simulation in real time (summary). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include generating the reactor simulator in real time, as disclosed by Alliston, incorporated into Russell so that the user will know how realistic the reactor simulator will work.

Response to Arguments

7. Applicant's arguments, see amended claims 8, 14 & 23, filed 3/15/2007, with respect to the Claim Objections have been fully considered and are persuasive. The objection of claims 8, 14 & 23 has been withdrawn.

8. Applicant's arguments, see pages 9 & 10 of the remarks, filed 3/15/2007, with respect to 35 USC 101 have been fully considered and are persuasive. The rejection of 35 USC 101 has been withdrawn.

9. Applicant's arguments filed 3/15/2007 have been fully considered but they are not persuasive. In regards to the applicant's argument of independent claim 1, the applicant states that Russell does not teach or suggest, "receiving user input to modify one or more design inputs used in creating a response surface." However, the examiner disagrees with the applicant. Russell consists of several input data files 201-206 and since each one is different, every time one of these files is used, the input is being modified. In addition, in column 1 lines 21-37, Russell teaches where "various physical component configurations and controllable operating conditions can be individually adjusted (modified if needed) or set.

10. Applicant's arguments, see page 11 of the remarks, filed 3/15/2007, with respect to the rejection(s) of claim(s) 5 & 22 under 35 UCS 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Alliston (U.S. Patent Number 3,916,445).

Citation of Pertinent Prior Art

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Alliston (U.S. Patent Number 3,916,445) teaches a training simulator for nuclear power plant reactor coolant system and method.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kesha Frisby whose telephone number is 571-272-8774. The examiner can normally be reached on Mon. - Wed. 7-3pm & Thurs. - Fri. 7-3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pezzuto can be reached on 571-272-6696. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kathleen Mosser
Primary Examiner
Art Unit 3714

Kyf
Kyf 6/5/2007